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ABSTRACT

This paper examines school productivity research--research regarding school effects on students, divided into two broad classes according to whether the dependent variable is (a) later life consequences or (b) immediate student outcomes. The discussion is organized in four sections. First, six major issues in the methodology of school productivity research are listed. This list provides some major reasons why school effects research may have been unsuccessful to date and suggests ways to better estimate the potential productivity of schools. Second, variables are introduced within the three domains of (1) school structure and organization, (2) social process, and (3) student outcomes. Specific aspects of these variables are examined to discover the role they play in the interplay between structure, process, and outcomes. Third, three directions for theory development which connect the organization, process, and outcome variables are outlined. A discussion of tradeoffs of school effects on students is presented. Trait-treatment interactions and individual differences are discussed. Parallel mechanisms of social control and individual motivation that are linked to the main organizational variables are detailed. The fourth section ties together the paper's conceptualization of school effects on student outcomes and suggests three broad kinds of research activity to make progress toward improving school productivity: (1) methodological studies to address some major technical issues in estimating school effects; (2) focused studies of specific causal connections between school organization properties, social processes, and student outcomes; and (3) basic research on processes of human motivation and environmental stimulus. (MM)

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Center for Social Organization of Schools

Report No. 218

October, 1976

PRODUCTIVITY OF SCHOOLS: CONCEPTUAL AND METHODOLOGICAL FRAMEWORKS FOR RESEARCH

James M. McPartland, Joyce L. Epstein, Nancy L. Karweit and Robert E. Slavin

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and research important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Organization program, presents a researchable definition of school productivity and offers conceptual and methodological frameworks to guide the conduct of the research.

Abstract

This paper defines school productivity research as research regarding school effects on students. The research may concentrate on immediate student outcomes or later life consequences.

The paper first examines important methodological issues confronting research on immediate school effects. Second, variables are selected from the domains of school structure, social processes and student outcomes that can be studied with conventional methodologies to address some new causal issues. Third, the paper presents general directions for theory development concerning the interplay of organizational, process, and outcome variables.

Introduction

A knowledge of school productivity means an understanding of the functional relationship between variations in school resources and important student outcomes. School productivity research is research regarding school effects on students.

Studies of school productivity functions or school effects can be divided into two broad classes according to whether the dependent variable is (a) later life consequences such as career attainments and adult participation in political or social roles, or (b) immediate student outcomes such as academic achievement and personality development. The two branches of school productivity research are often dominated by different academic disciplines or subdisciplines--economists, demographers and counseling psychologists have worked mostly with the career attainment questions, while survey research sociologists and educational psychologists have concentrated on learning effects. Separate branches of the National Institute of Education also focus on long-run versus short-run outcomes of schooling--the Education and Work Group concentrates on the effects of schools on careers, while the Productivity Group and the Basic Skills Group concentrate on immediate outcomes of school.

To be sure, there are natural links between these two aspects of research on school productivity. Occupational or educational aspirations outcome variables are frequently studied by researchers who use immediate

student attributes as their primary dependent variable, and these aspirations play an important part in later life adult roles. The political and social attitudes of students, which are also frequently studied as immediate outcomes of schools, are also important to adult roles. On the other hand, research on the career attainment process sometimes considers academic and nonacademic skills achieved in school as a factor in determining adult occupational status, in addition to educational status as measured by years of school completed or diplomas and credentials received. Also, in general, the literature on immediate school effects concentrates more on the variety of ways that school experiences may differ (this research has a much richer set of school variables), while the status attainment literature spends more time considering how non-school influences such as family and occupational experiences compete with schools in developmental processes. (This research views non-school variables as factors which interplay with educational experiences rather than as disturbances to be statistically controlled.)

Neither branch of school productivity research sees the internal processes of schools or the politics of education as the ultimate dependent variable, although there are major research activities in the sociology of education which do concentrate on topics such as working conditions for teachers or school board decision-making. School productivity research always has its eye on the effects on students either immediately or for later life. Social processes within schools are of interest in school productivity research because they may help explain how certain variations in school structure have impacts on student outcomes.

Certainly there is much work to be done to confront the two approaches of school productivity research, by addressing such questions as educational skills versus credentials in determining occupational achievement, types of school experiences that have most long run payoffs given equal years completed or credentials received, and the school's role in the developmental process through which enduring personal characteristics and attachments arise. But this paper will concentrate on school productivity research that is mainly concerned with immediate effects on student skills and attitudes.

This distinction between long run and short run outcomes of schooling is offered to begin this paper with a working definition of school productivity, and to locate the work of researchers and programs in this Center within the NIE structure. We will return to some selected issues of how long run consequences of schools may affect school effects on immediate student outcomes, but this paper will primarily address the NIE Productivity Group's goals of understanding and improving school effects on student academic and nonacademic skills or attitudes.

Because of a belief that conceptual and theoretical statements are only useful if they indicate how clear empirical data can be brought to bear to test the critical distinctions or propositions, this paper will treat both methodological and conceptual issues. The process of maintaining an interplay between theoretical exercises and empirical evidence may be the most difficult in social science research, and the optimum balance is always a matter of judgment conditioned by empirical opportunities and the current state of the art. The strategies for using various empirical settings--field studies on natural variations,

field experiments, laboratory experiments and hypothetical data--are particularly troublesome in school research because natural variations are extremely difficult to find or construct and external validity or generalizability is always important.

This paper is organized in three main sections. First, some major issues in the methodology of school productivity research are listed. This list provides some major reasons why school effects research may have been unsuccessful to date in showing sizeable relationships, and what might be done methodologically to address these possibilities to better estimate the potential productivity of schools. Second, variables are introduced within the three domains of school structures, social process and student outcomes which current research suggests are worthy of present empirical attention. Specific aspects of these variables are examined to suggest the role they may play in important propositions on the interplay between structure, process and outcomes. Variables are selected and the frameworks are chosen to generate a series of empirical studies that can make practical and theoretical contributions at this time. Third, a more general stance is taken to comment on school productivity theory development. Some ideas are presented on how knowledge about school effects could be collected and organized, and on the broa. alternatives for social control or student motivation that school effects studies should ultimately inform.

I. Methodological Issues for School Productivity Research

School productivity research using existing school differences has not uncovered sizeable effects on students. There are at least six methodological reasons which may account for this problem, which should be directly addressed in any program of research on school productivity.

Some of the six reasons in this list deal with the limits of data obtained from actual school settings. Some of these reasons suggest future work to examine the "potential" of school variables by extrapolating or projecting original estimates on the basis of sensible assumptions about developmental processes. Other of these reasons suggest future work to extend our measurement approaches through variable development or carefully constructed analogies in non-school environments for school-like variables. Still other reasons point to the need for collecting data on customary variables in a more complete or extended manner. And some reasons deal with inherent problems in non-experimental data such as regression effects or confounding of measures, where summary statistics need to be selected for interpretation that reflect the extent of underlying difficulties and make sensible adjustments where possible.

Following is a list of methodological issues which may have inhibited our understanding or caused us to underestimate potential school effects.

1. The need to estimate cumulative school effects over an extended duration of time.

We have not found many sizeable school effects when we compare the present schools of representative samples of students, but what would be found if present school differences persisted for several years? Would the typical small school effects cumulate over time, so that a sizeable

impact of school differences would become evident if certain contrasts continued over many years?

For example, a reasonable explanation for why family or neighborhood effects are large and school effects are small is that a student is exposed to a consistent environment for the first variables but not for the second. The inconsistency of the school environment becomes obvious when we observe that the average student may have an exceptional teacher one year and a poor one the next.

There are two main ways to address the issue of the potential cumulative impact of schools. First is to address the issue directly by measuring the effects of the duration of exposure to specific school differences. The work of Hallinan[1] has suggested how extrapolations may be made of potential school effects with assumptions or estimates of cumulative growth curves; and the research which has used duration measures [2] has demonstrated the value of using variables with time dimensions. To pursue this line requires naturally occurring student experiences where a specific school contrast has persisted for some time beyond the usual one-year duration. This is easier to find for such school context variables as racial composition or school openness than it is for school variables that involve the quality of the teacher or of the classroom instructional program.

The second approach is indirect, and involves a search for teacher or classroom environments that show a consistent small positive effect year after year even though the students exposed to these exceptional

environments change each year. For example, when separate annual records of student performance are examined over several years, can some teachers be found who consistently demonstrate an above average one-year-impact on their students' learning? This approach is indirect because, rather than looking at the cumulative record of a single group of students having different teachers, it examines the record of many cohorts of students who are exposed for years to the same set of teachers and searches for teachers who consistently have above average success with their classes year after year. Klitgaard has detailed some methodological approaches for identifying exceptional schools or teachers, which if applied annually for several years could point to the records of consistency we have in mind. Once identified, we would have indirect evidence that school effects would be larger if true differences which last usually for a single year for a given student could be continued for an extended period.

Of course, examining the cumulative effects of schools could result in findings that agree with the current belief that school productivity is very small. We could find, given reasonable assumptions or estimates of the long term exposure to school differences, that the school's potential impact is indeed minor. But, until variables which incorporate duration of exposure measurements are used, we do not actually have strong evidence one way or the other.

2. The need to estimate potential school effects of a wide range of school variations.

Most effects studies have used school variables that are not only limited in duration, but are limited in the range of variation. While we know that school differences as they <u>presently exist</u> in terms of class size and other instructional resources are not important correlates of

student achievement, we do not know whether these differences would remain unimportant if they were compared over a broader range of possible variation. The proper interpretation of most studies of school effects may be not that school differences in the variables under investigation are unimportant, but rather that all schools are very similar in their resources and equally powerful in their impact.[4]

The current work of Karweit[5] and Wiley and Harnishfeger[6] regarding the variables of exposure to school are centered on this issue. As Karweit points out, we need to gather data on a wider range of the exposure variables to establish the shape of the relationship with student learning. We need to find whether there is a threshold point where additional schooling is strongly related to learning, and, more generally, to identify the "scope conditions" and possible curves through which school exposure and student development are related.

Again, direct and indirect approaches are called for, given the limitations in natural variations. First, we should search for data that cover wider ranges of variation in school inputs, so there is a direct basis for estimating non-linear relationships. But, also, we need to bootstrap our analyses of the potential of school differences by using projection techniques based on informed assumptions about relationships[7] and by taking advantage of analogous learning environments outside of schools to get clues on the potential of non-existent but possible school differences.[8]

3. The need to identify student-school interaction effects and to estimate school effects for specific student subgroups.

It may be that school effects are insignificant for many types of students, but there exist certain subgroups of individuals where the

potential impact of schools is impressive. This raises the possibility that our failure to find important school relationships is due to the absence in most studies of careful consideration of trait-treatment interactions or separate student subgroup analyses.[9]

Our methodologies for searching for interactions in non-experimental studies are underdeveloped. We need procedures to efficiently consider many possibilities while guarding against the statistical aberrations which can incorrectly indicate the presence of interactions[10] or their absence. These procedures should allow for more complicated interaction patterns to be examined than the simple "high-high" combination that is tested with the conventional product term used for interactions in regression analyses. And, we need to establish procedures which treat control variables in a comparable way when subgroups analyses are focusing on the joint relationship of two selected independent variables on a particular student outcome measure. In short, the approaches needed to examine interaction patterns in non-experimental studies are not to be found in standard statistical text books, and have not been carefully developed for many important methodological issues.

4. The need to study school effects on a wider range of student outcome variables which are more responsive to short term environmental influences.

By concentrating on student outcomes that are measured by standardized achievement tests or by attitude scales of occupational aspirations, school effects studies may be using dependent variables which are least likely to respond to school differences. For one thing, tests of relative achievement may have a large genetic component and a small

environmental one. Also, such tests are constructed to maximize within group variance rather than environmental impact: items are selected which split the population in performance rather than on the basis of reflecting maximum change over time in a developmental pattern.[11]

To adequately investigate the potential school productivity, we need different kinds of measures which emphasize developmental changes, and we need to consider outcomes which may be less immune to environmental influences than cognitive achievemert. Some of these possibilities and additional reasons for greatly expanding the dependent variables in school productivity studies are given in a later section of this paper.

5. The need to treat the problems of student self-selection in school effects research, so that school productivity estimates are not over-controlled.

There are no statistical tricks that will solve the problem in non-experimental studies of student background variables being confounded with school differences. If these problems in the data are serious, there is simply no way to attain a separate estimate of school from background effects. But, often the problem is not this serious in the naturally occurring data, so what is needed are approaches and summary statistics that conveniently permit different estimates for different models or assumptions about how to treat confounded variance or multi-colinearity. Some maintain that school effects in previous research have been seriously underestimated because of faulty treatment of confounded variance.[12]

There remains confusion about how to procede methodologically in the face of confounded variance. Structural models using path analysis

and the estimation of indirect effects is becoming the dominant approach in social research. The competing approach is commonality analysis where summary tables of unique and joint components of variance are estimated for major variable clusters. Duncan rejects partitioning and partials as helpful replacements or adjuncts to structural assumptions and path estimations.[13] He apparently prescribes establishing models with unmeasured variables and complicated causal chains to deal with the appearance of intertwined measures. But, the situation remains that path analysis is not meant to be a data reduction technique (many models can often be assumed and estimated) nor do the usual summary statistics reported by path models clearly alert the researcher to the problems of empirically separating related background and environment measures.[14] We need further work to guide research where assumptions about structural models are difficult to make, where problems of self-selection must be examined directly, and where the goal is to measure the potential of environmental treatments rather than to describe the current relationships involving self-selection and environmental influences. Student self-selection remains an overriding problem in studying potential school effects, and path analysis alone may not offer adequate guides to treat this problem in alternative sensible ways.

6. The need to estimate effects of proximate school environments rather than distant indirect influences: the questions of level of analyses and contextual measures.

It may be that we have failed to find school effects because we have used superficial measures of school environments, rather than variables which actually tap the differences that students experience in the classrooms. For example, in the Coleman survey, all measures of teachers were based

on faculty averages across an entire school that were associated with each student in the school. Perhaps teachers would have appeared more important if each student had reported on his or her own classroom situation. Wiley,[15] McDill[16] and others have outlined some methodological considerations when effects on student learning are examined from several levels of analysis.

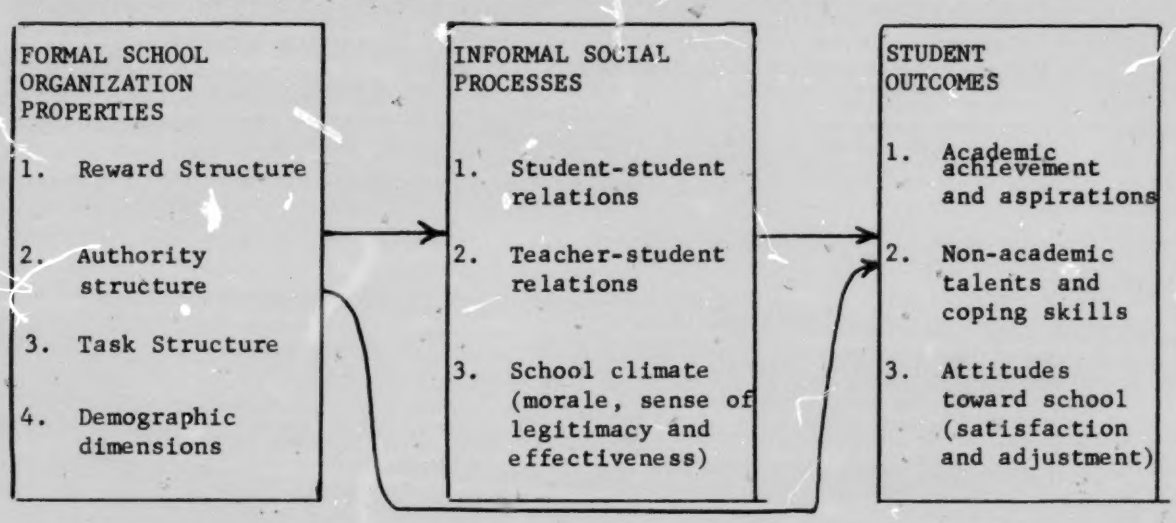
On the other hand, Hauser[16] and others are suspicious that contextual measures based on aggregates of student perceptions may not be true environmental measures but merely reflect initial personality or background differences of the students themselves. A recent Center study has indicated how distinctions between school structure, social processes and student background can be identified by the statistical criterion of between group variance.[17] Extensions of this work, and other studies of proximate environments, should aid in investigations of the effects of actual school experiences.

The general point illuminated by all six of the methodological issues is that we cannot adequately make statements about school productivity or potential school effects until some critical empirical issues are addressed. We now know neither whether current beliefs that existing schools have small effects on student development are accurate nor where the future potential of school variations is most promising for further research and development.

Theory development is needed for school productivity research, but most needed are theory statements that suggest empirical tests. Unless evidence can be brought to bear quickly on new ideas, the ideas may be of limited scientific and practical worth. But, at the same time, we have general methodological issues that must be considered to conduct many empirical studies. These issues should be directly addressed at the same time that theory development and specific research studies are proceeding.

II. School Organization and Student Outcomes: Concepts and Definitions

The following figure gives the familiar general diagram for locating school organization variables and informal social processes in a causal sequence with student outcomes.[18] This outline is greatly simplified: it leaves out the demographic and political forces which condition school changes; it does not indicate that individual attributes of students or teachers may interact with environmental forces for effects; it concentrates on the school as the unit of impact; it ignores the relations and interactions within major variable blocks, and it omits the details of variable definition and causal arguments. These factors are addressed


FORMAL SCHOOL ORGANIZATION PROPERTIES
1. Reward Structure
2. Authority structure
3. Task Structure
4. Demographic dimensions
INFORMAL SOCIAL PROCESSES
1. Student-student relations
2. Teacher-student relations
3. School climate (morale, sense of legitimacy and effectiveness)
STUDENT OUTCOMES
1. Academic achievement and aspirations
2. Non-academic talents and coping skills
3. Attitudes toward school (satisfaction and adjustment)

in this section and the next. The general scheme highlights fundamental points in a research strategy on school productivity.

The first research strategy involves the primary role of school organization variables in research directed toward practical improvements

of schools, and the second strategy deals with the need to extend student outcomes beyond the traditional concerns with strictly academic skills and aspirations.

1. School organization variables encompass the structural arrangements which define the formal reward, task and authority dimensions of the school environment. A distinction is made between these formal properties of the environment and the informal processes in schools -- such as peer group norms, teacher-student affective relations, definition and criteria for social prestige, and teacher expectations. School organization variables are seen to be more subject to direct change, experimentation or manipulation in practice than are the informal social processes of schools. If the goal of research in school productivity is to gain useful knowledge on how to improve the effects of schools on important student outcomes, then the school variables which are most open to purposeful change must be given a primary role in the research strategy. It does little practical good to learn how the informal processes of school or the individual attributes of teachers or students affect student development without also knowing how these variables can themselves be directly influenced.

2. Similar reasoning suggests that future research needs to consider a wider range of student outcomes in studies of school effects. Although student mastery of the basic academic skills measured by familiar tests of reading, mathematics and subject matter facts is the major goal of public schools, it appears that the distribution of such

skills is not easily changed by environmental influences in a period as short as one school term. However, there may be other human talents and attitudes which are less immune to school treatments that are also skills to be valued and useful for students in facing adult roles. Indeed, there are some studies which suggest that adult accomplishment is not well explained by the school grades or test scores that have been emphasized in productivity studies, so that other elements of human talents may be more needed and valued by major segments of society than exceptional achievement in basic academic skills. If a research strategy is to consider student outcome variables that may be most open to school impact and that may be significant in accomplishing adult roles, then future studies should systematically expand to emphasize student outcomes that go beyond the strictly academic talents.

SCHOOL ORGANIZATION VARIABLES

Four broad classes of school organization variables will be discussed: reward structures, task structures, authority-control structures, and demographic dimensions. The purpose here is to establish the definitions and typologies which will be used to examine the causal hypotheses advanced in the third main section of this paper.

Reward Structures

The basic concepts and typologies that define classroom reward structures and the major research questions and evidence to date can be found in recent Center Reports 186 and 207.[20] Some of the main points will be outlined in the following paragraphs.

Classroom reward structures refer to the performance criteria, contingencies or standards students must satisfy in order to receive particular presumably valued or reinforcing consequences. In other words, classroom reward structures involve the rules under which students are rewarded for academic performance. One way to outline some major types of reward structures is to consider the typology formed by two variables: (1) the criterion for determining successful performance (absolute standard independent of other students' performance versus relative standard where one's success is determined by one's standing in a group performance distribution) and (2) method of distribution of rewards (individuals receive rewards versus groups receive rewards). Another way of stating these two variables is (1) reward interdependence (one's rewards do not depend upon what others receive versus one's rewards are negatively related to what others receive) and (2) level of response (individual performance is evaluated versus group achievement is judged).

The following Table uses these variables to define a typology of reward structure types:

Method of Distribution of Rewards (Level of Performance Evaluated)	Criterion for Performance (Reward Interdependency)	
	Absolute Standard (Individual rewards are not negatively interdependent)	Relative Standard (Negative Reward Interdependence)
Individuals receive rewards (Individual performance is evaluated)	Independent Rewards (Individual reward contingencies)	Individual Competition
Groups receive rewards (Group achievement is evaluated)	Cooperative Groups (Positive reward interdependence for group members)	Group Competition

There are several interesting complications, such as the question of distributive justice in dividing group rewards among members, the level of simplicity or complexity of required behaviors, and the degree of need for coordination among group members in different task situations. These are treated in some detail in the Center Reports which review the research.[21]

To analyze the effectiveness of each of these general types, and of some of the interesting combinations of the types such as Teams-Games-Tournaments, requires a consideration of some elemental motivational properties which can vary in each cell depending upon the type of reinforcers used, the mode or content of the task to be achieved, and the distribution of talents in the student population required for acceptable performance. A successful reward structure (which can be called "a responsive environment") requires the following three motivational elements:

(a) Valued incentives: the official reward or reinforcer being offered for appropriate performance must be of sufficient worth, compared to other rewards in the system for inappropriate behavior that are not controlled by the official reward system.

(b) Probability of success: each individual should have a promising chance to achieve success, given a reasonable amount of effort. This also means that the schedule of expected reinforcement should be frequent, so that some rewards are received within short periods of time.

(c) Fair distribution of chances: the probability of success should be roughly equal across the population of students, regardless of individual differences in starting point of performance or growth rate over time.

Each of these motivational components could theoretically be changed directly, but in practice this can be very difficult, requiring detailed knowledge for continually adjusting performance criteria, administative attention to record keeping and frequent evaluations, and costs of providing valued incentives. One example for each motivational element will

suggest the practical problems. A valued incentive can always be found by continually offering money to students for appropriate behavior, but school budgets and popular opinion place severe limits on such added costs. A reasonable probability of success can be established by adopting appropriate standards, but this requires detailed objectives and tests that match the performance level at each grade level in each school in each subject. A fair distribution of chances requires that each individual's starting point and average probability of success be reliably assessed at a given point in time, and that the criterion for improvement or the tracking into ability groups be set and continually adjusted so that the same amount of effort be required for the same expected standard for each individual regardless of his or her individual profile at the time.

There are certain situations where the direct implementation of these motivational elements is possible. (Certain privileges may be offered as a cheap but valued incentive, and certain subjects such as typing may readily permit accurate individual assessment and tables of expectation standards.) But the study of reward structures, such as those outlined in the above Table, offers a way to feasibly address the basic motivational elements by capturing the natural (presently informal) incentives available in the classroom and by establishing a routine system for self-correcting the standards of performance to approximate a reasonable and fair chance of success for all individuals.

There are at least three directions for future research and

development on reward structures. The first is to study the effects of reward structures with attention to the particular subject matter content to be taught, with the idea that certain tasks may be best motivated under a particular reward structure because of the natural distribution of talents, the usefulness of group inputs for learning, or the ease of setting individual criteria. This would include a detailed treatment of Competency-Based-Education in the framework of reward structures and indivdual motivational forces. Current research does not give a clear over-all indication that one reward structure is optimum for all situations and contents,[22] and this approach would seek detailed knowledge of the task content and demographic conditions which favor each particular approach.

The second approach is to search for a single combination of the reward structures outlined above which is best suited motivationally and practically for the typical heterogeneous classroom and for the most common academic learning contents. At present, this Center has developed one such combination, "Teams-Games-Tournements (TGT)."[23] The Johns Hopkins Program has become the major center of activity of research in this country on group contingency structures,[24] and TGT has been studied extensively for its effects for a variety of subject matters and population groups. Important work remains to study particular variants and modifications of the basic TGT model, to meet practical considerations, and to study the unique process effects on each motivational element.

At present, TGT pairs individual competition across teams with

inter-group standards for rewards, while allowing for cooperation among group members. Each element of the TGT structure addresses an important motivational element. The "team" factor seeks to capture the peer approval for group achievement that in traditional classrooms has often been counter to learning performance goals. The "games" factor seeks to establish a social learning task that has intrinsic novelty and interest for students involving academic drill, which can be routine and boring in the traditional classroom. This factor also establishes immediate feedback for all individuals on a frequent basis. The "tournament" factor routinely re-establishes the standards for performance to guarantee a fair and reasonable probability of success for each member of the class. There are several modifications of TGT worthy of further study, and there are explicit designs for further research to examine the elements in the motivational process in detail.

The third approach is to examine the actual resources and demography of the classroom in terms of how they affect motivational elements in practice. What behaviors do teachers actually reward and punish in various classroom operations?[25] What is the incentive value of various actual and potential classroom rewards, such as grades, privileges and approval? What are the practical management difficulties in keeping accurate information and developing reliable responses to specific student behaviors ranging from attendance to academic performance? What are the capabilities of teachers to make accurate subjective assessments of a student's starting point or relative performance in class (can teachers

distinguish effort from relative performance)? Answers to each of these research questions would help set the bounds on thinking about practical improvements in traditional classroom reward structures.

In all of this, the level of analysis is an additional dimension to be addressed. How do effects of reward structures at the classroom level generalize for considerations of reward criteria at the school or system level?[26] How do system goals for uniform minimum standards affect the motivational elements in the classroom for individuals along a continuum of ability level?

Authority-Control Structures

Definitions of types of authority from the works of classical sociologists and organizational theorists can be found in standard textbooks[27] and have been applied to the school and classroom settings in recent extensive conceptual works.[28]

Many questions of authority-control pertain to the formal reward system: who has the power over formal rewards and punishments to control particular behaviors of whom? Defining authority-control in this way would involve a hierarchical chart of power positions that define the compliance perogatives between superior and subordinate ranks for particular actions. But rather than detailing these formal authority relationships between ranks, and detailing the kinds of behavior that subordinates are rewarded for by their official superiors, we will take the perspective of an individual student in a school and consider his or her participation in two kinds of decisions. Under this formulation, we

define the authority-control structure faced by an individual student to be the degree of participation permitted in "governing decisions" and in "consumer decisions."[29]

Governing decisions establish the rules or regulations in a school that define the specific alternatives legitimately available for individuals. Governing decisions establish the laws which must be followed in the school community and the penalties for breaking these laws, as well as setting out the requirements which must be fulfilled to receive the official rewards that are dispensed in the school. The first dimension of the school authority system concerns the degree of participation of students and others in the governing decisions. This is the question "who sets the rules?"

The governing decisions which are made define the choices which are open to each individual and the immediate official consequences of making various choices. The permissible alternatives open to individual choice comprise the "consumer decisions." This second dimension of the school authority system concerns the kinds of alternatives or choices that are available to individual members in the school. A student has a large degree of participation in consumer decisions if there are many alternative choices open and few restrictions on freedom of action. This is the question "How many different ways are there of receiving the official rewards in school?"[30]

We can focus on three important causal questions by defining the school authority structure from the perspective of student participation

in governing decisions and consumer decisions. First, we can compare schools in terms of the coping skills that are required from students to deal with environmental constraints and opportunities. The degree of participation a student exercises in governing and consumer decisions can itself provide learning experiences for developing a variety of non-academic skills, such as interpersonal relations, leadership in group settings, planning habits, self-reliance, and assessment of social realities. Schools can give more or less practice in various coping skills by the way the authority system provides specific opportunities and demands on students. Second, the affective component of school life can be studied in relation to school authority structures from the student perspective, including satisfaction with school, commitment to classroom tasks and relations between staff and students. Third, as we shall discuss in more detail in the third section of this paper, participation in certain school decisions can be hypothesized to develop student attention to long range goals which can foster motivational forces to behave appropriately without receiving immediate rewards for performance. From the perspective of control mechanism rather than individual motivation, there is reason to believe that the kind of school authority structure can influence the availability of "normative or social" controls in the system to reduce the need for "coercive" or "utilitarian" controls.[31]

Thus the study of authority-control structures can address questions of school effects on non-academic skills or affective domains, and it can be incorporated in a motivational theory that goes beyond reactions

to immediate rewards and punishments.

Task Systems

There are three dimensions of task structure which seem important for the model of student motivation we will be developing in the third main section of this paper.

The first task dimension is the time constraints placed on performance. Time constraints can theoretically have important motivational consequences. Individual differences in ability to perform a given task frequently are reflected in the amount of time needed to achieve success: many tasks could be achieved by most individuals in a population if each was given the time needed for practice to mastery. Thus, the time constraints for performance often have a direct relation to the individual probability of success and the fair distribution of chances in a population. Also, time constraints can affect the intensity with which an individual can devote attention to a task. Tasks that are segmented into short units may not permit the focusing of energies and interest that can have unique motivation and learning effects.

The second task dimension is the social and skill requirements for performance. Some tasks, such as "desk work," make use of a limited range of language skills such as reading comprehension and writing. Other tasks may require manual talents, verbal skills, or artistic expression. Some tasks may be organized in group settings, where there is a regular flow of social interactions, in contrast to solitary assignments that involve

no continuing interpersonal feedbacks. Other tasks may have a high degree of novelty and spontaneity, in contrast to activities which are more routine and predictable. This task dimension, the mode and style of the task, may be important for several reasons. Individual differences in verbal, manual, written and artistic skills may make one kind of task more attractive or manageable for particular students, affecting motivation or attention. Some dimensions of a task, such as its social or spontaneous aspects, may affect its intrinsic interest for the average student and the willingness to perform without outside incentives. For example, work at this Center with Teams-Games-Tournaments suggests that the games element of this approach has intrinsic incentive value because of the social and spontaneous mode of these tasks.

The third task dimension is the division of labor and need for coordination that can vary across tasks for successful performance. This becomes of particular interest in studying group activities in the classroom. A familiar problem in designing group tasks is preventing the work flow from degenerating to a situation where one group member does all the work. In learning situations, it is usually the goal that all individual students receive exposure and practice with the skills or materials involved, so that task structures to achieve adequate division of labor and coordination become an issue in group activities. In general, the benefits from specific reward structures, such as use of group criteria and distribution principles, may depend upon the structure of the task.

There is not an extensive body of theory and research on dimensions

of task structures in the classroom or on how task structures can affect motivation or classroom processes.[32] There is not much earlier work to generate research questions and designs, so a wide variety of new studies hold promise to provide original knowledge. Knowledge of the potential importance of variations in task arrangements is well behind our understanding of other school organization dimensions.

Demographic Dimensions of School Organization

There are at least three demographic features of a school that may affect the implementation or operation of specific reward, task or authority structures. These demographic features are school size, differentiation boundaries within the student body, and background characteristics of the student body enrolled in the school.

Several studies suggest that school size can have important effects on social processes and student outcomes. The Barker and Gump study of high school size found that students in small schools participated in a higher proportion and wider variety of the activities available, due in part to the stronger social forces that exist in smaller units where there is high visibility of each individual's behavior.[33] Boocock reviews direct and indirect research on school and classroom size, and identifies important elements of group functioning that may be consequences of group size.[34] A recent study and review of evidence on causes of crime in the schools found that school size was

negatively related to delinquency problems and explained the relationship by arguing that size affects the efficiency and reliability of the school incentive system and the probability of student participation in decisions.[35]

A school's students are frequently organized into grades, programs of courses, tracks, and homerooms which establish boundaries that can restrict the natural contact between different elements of the student body.[36] For example, a traditional school without departmentalization of teacher assignments or non-graded classes may expose each student to contacts with many fewer classmates of different ages than a school where courses are not restricted to one age group and where an individual's classmates are different from course to course. Or, in another example, racial contact in desegregated schools may be restricted if tracking is used to group students in classes according to previous performance, and the whites have the best records needed for high track assignments.[37] Many of the most important peer contacts for school effects require contacts of disadvantaged individuals with advantaged students, younger students with older ones, or between racial groups, so organizational differentiation practices that restrict these contacts can play a significant role.[38]

Finally, the distribution of the background characteristics of students enrolled in a school place a general limit on the probabilities of heterogeneous contacts among students. Obviously there can be little interracial contact if the school is almost entirely of one race, or little influence of advantaged peers and disadvantaged individuals if a school

is almost all poor students. Since some of the most powerful social forces for influence come from heterogeneous contacts within peer groups, the enrollment distributions of student attributes can be a very important variable.

Summary: School Organization Variables

This section provides some definitions of major organizational dimensions in schools and their variable properties, while suggesting a rationale for choosing these variable properties for study in a school effects program of research. The following table outlines the main distinctions that were drawn, and lists some of the rationale offered.

OUTLINE OF SCHOOL ORGANIZATION DIMENSIONS, PROPERTIES AND RATIONALE

Organizational Dimension	Basic Variable Properties	Some Possible Motivational Forces Affected by Variations
Reward Structure	1. Reward Interdependencies, and 2. Criteria for Performance, define a. Independent rewards b. Cooperative groups c. Individual competition d. Group competition	1. Value of incentives 2. Probability of success 3. Fair distribution of chances
Authority System	1. Participation in Governing Decisions (who sets laws and choices?) 2. Participation in Consumer Decisions (what alternatives are open to choice?)	1. Practice at non-academic talents 2. Affective outcomes, including teacher-student relations 3. Attention to long-range goals, or normative control
Task Structure	1. Time constraints 2. Skill and style dimensions 3. Division of labor and need for coordination	1. Intrinsic motivation due to social or spontaneity aspects 2. Probability of success due to individual differences in skills 3. Social pressure for involvement
Demographic Conditions	1. Size 2. School differentiation boundaries 3. Background characteristics of student body	1. Ease of applying formal incentives and participation opportunities 2. Social pressures from visibility 3. Opportunities for Social Influence Processes

SCHOOL PROCESS VARIABLES

This discussion will be organized under two subtopics: student-student relationships and teacher-student relationships.

Research studies in the sociology of education have included many treatments of the peer-group process. The majority of these studies, however, have been based on contextual analyses (where some aggregated measure of schoolmates has been assigned to each individual student and related to some individual outcome after controls on background and ability are applied), and have not given detailed attention to the description of peer group attachments or to the separate elements of the peer group process. Important advances are possible by moving from the gross measurement approaches of most earlier work and by taking advantage of data in which the aspects of peer group formation can be separated from the mechnaisms of influence between students.

Current work using techniques of social network analysis shows promise of describing important variable dimensions of the peer group which have been ignored in most contextual studies. There are at least three dimensions involved. First is a description of the shape of the peer group hierarchy in a school or class, ranging from an egalitarian system--where the highest prestige levels have many members, few individuals are social isolates, and no ethnic or social class group is unequally represented in prestige categories--to a highly elitist system--where high prestige levels are proportionally exclusive and many individuals are left out from high status positions, especially if they are members of ethnic or social class minorities. Second is a description of certain structural properties of the peer group connections of individual students, such as the

heterogeneity of peer group characteristics, the mutuality of choice among peer group members, and the connectedness of the networks. Each of these structural properties can be averaged across individuals in a class or school as another basis for comparing the peer group at the school or class level of analysis. Third is a description of the basis or criteria for status, such as whether athlete-scholars only receive status, or whether other attributes, such as originality, may result in status in a peer group.

Each of these three dimensions of peer group structure may have important effects on student outcomes, and may be caused or facilitated by school organization factors.

1. Distribution of status: The shape and distribution of the peer group status hierarchy may determine the force and saliency of peer group pressures on the average student in a school. If the top levels of the peer group hierarchy not exclusive, but are easy to penetrate, we would expect the enforcement powers of peer group influence to be weaker. An individual student in this situation would not have to protect his or her peer group status with a very strict conformity to norms, both because high status is less exclusive and less valuable and because there are many alternative peer cliques from which to obtain high status so that losing membership in a single clique is not so critical.

The enforcement strength of the average peer group in the school is a very important variable for understanding school effects on academic performance. If Coleman and others are correct that the peer group in a typical high school places little value on academic performance of its members, then there are two logical possibilities to address this problem in school reorganizations. One possibility is to structure academic competition so that peer group pressures come to reward rather than punish

academic excellence. This is a main idea behind the team or group incentives described in the previous section. A second possibility is to weaken or eliminate the peer group power, so that other influence forces which reward academic effort can operate without competing with the strong counterproductive rewards of the peer group. If we can learn how to develop individuals or situations that are more immune to "the tyranny of the peer group," we should be able to increase the school's power to influence academic achievement.

Although there is presently no convincing evidence on the point, several ways can be hypothesized in which school organizational structure can affect the shape and distribution of peer group status. For example, a school which has a complex rather than simple class assignment system should reduce the dominance of a few high status groups. A school where each student changes classmates several times throughout the day should weaken the power of the peer group, because no single clique could affect a person with continual surveillence and pressure. In other words, a more diffuse and intermittent set of social contacts should weaken the informal hierarchy and influence patterns in a school. Another example of potential organizational influence on the distribution status is the number and variety of opportunities for gaining official recognition in a school. A school which has a large number of extra-curricular activities and which takes official notice of non-academic skills in the classroom will provide each individual a greater chance of gaining prestige, and should produce a more evenly distributed and less skewed peer status system.

2. Structural properties. There are a number of structural properties of informal groups--including heterogeneity of membership attributes, mutuality and connectedness of networks across cliques--that are just

beginning to be studied with social network methods for school sociometric data. [See, for example, the work of Karweit (1976) and Hallinan (1974)].[39] We will use one example to describe how these considerations may condition peer group effects and may result from organizational properties of schools.

The heterogeneity of membership attributes in peer groups may be a critical element for whether a peer group serves only to strengthen initial attitudes of members or operates to influence change in student perspectives because of membership. The current most popular theory of peer group processes emphasizes the force of naturally forming peer groups to strengthen existing differences among individual students. This theory--which has been called "the accentuation process" (Feldman and Newcomb, 1969)[40] or "the theory of progressive conformity" [Astin, (1970) and Astin Panos, (1969)][41]--sees the selection and influence aspects to be closely tied together around a single or limited number of salient peer group attitudes. According to this view, students join peer groups because of perceived similarities with other members, and these similarities are reinforced through peer group influences so that they become strengthened for each member as time goes on. But if we consider a much larger number of membership attributes, and compare peer groups on the heterogeneity of members on other attributes than those which attracted initial joining, we have the basis for potential influence for individual change as well as strengthening initial differences. In other words, the basis for peer group selection does not have to be the sole basis for peer group influence, if we can design studies to examine possible heterogeneity of peer group attributes. (One such study which could be done with data at this Center would focus on extra-curricular activity groups which may enlist

members on one common interest, but which provide the basis of influence from heterogeneity on other interests.)

A single organizational property that may affect the heterogeneity of of naturally forming peer groups is the organizational differientiation of a school. Karweit's (1976)[42] studies suggest that the way curriculum programs are organized in a school can affect whether friendship groups are of the same sex, race and age.

3. Criteria for status. Another important element of the peer group is the criteria used for status rewards. It is questionable whether peer groups adopt the "well rounded individual" (who is an athelete or socially attractive as well as a good student) as the major basis for status in all schools. There should be exceptions in some schools to the peer group syndrome of the "All-American boy or girl," and these exceptions would be important to discover and understand in their etiology. Some recent work at this Center by Epstein and McPartland (1976)[43] suggests that open schools may facilitate a different basis for peer group status, on which emphasizes originality and self-reliance.

The peer group process has been identified in large survey studies such as the 1966 Coleman Report to be the most powerful force for influence in secondary schools. We need therefore to move our theories and empirical studies from the dead center of aggregated contextual analysis that has characterized this area for twenty years. The methodologies of social network analysis and the theoretical elaborations which permit a separation of the selection and influence aspects, together with attention to organizational conditions in school, hold real promise for developing

new understandings of this most powerful process.

Teacher-student relations have also been dominated by theories with limited practical importance. For example, the findings that teacher expectations may be important (Elashoff and Snow, 1971)[44] and that teacher "enthusiasm" and "acceptance of students' ideas" (Gage, 1976)[45] may affect student learning, share a similar problem: "How do you get teachers with the appropriate qualities?" One answer is that we train teachers in college for good expectations, high enthusiasm and open acceptance, but we have little evidence to suggest that such training exhortations and proselytizing will be effective. (This may somewhat overstate the case, since Entwistle and Webster (1972, 1974)[46] and others have had some success in experimentally creating such teacher-student conditions in classrooms.) We need evidence on how much differences in these teacher-student relations are found between schools, and on what kinds of schools recruit or facilitate desired teacher approaches toward students.

A recent Center paper by McPartland and Epstein (1976)[47] illustrates a direction for studies of teacher-student relations. This paper first compares school and teacher properties on the extent of between-school and within-school differences for a purposefully selected sample of diverse schools. It is found that while structural properties of instruction are reported with impressive between school differences, equally reliable measures of teacher-student relations show a dominant pattern of high <u>within</u> school variance and small between school differences. This suggests that teacher approaches to their relations with students may be a strong function of initial personality dimensions of individual teachers which are fairly randomly distributed among schools. At the same time, results

suggest that certain school structures can facilitate the emergence of particular teacher approaches, such as rewarding student originality and creativity or accepting student participation in classroom decisions. Either through differential recruitment of staff or through official sanctioning of teacher initiatives, it appears that organizational structure can have a small but significant effect on teacher-student relations. The work of Cohen and her colleagues at Stanford (1966)[48] also suggests how the visibility deriving from organizational arrangements of classrooms can affect important teacher attitudes. We need to learn more about the specific kinds of teacher attitudes that are open to school influences (rather than relying on training programs to reform attitudes or personalities) and about the school environments which enable desired teacher-student relations to flourish when the predispositions are present.

STUDENT OUTCOME VARIABLES

There is a good deal of opinion current in research circles that schools have their largest potential effects on nonacademic outcomes and that nonacademic human talents or attitudes are more important than academic ones for explaining adult accomplishment and success in life. But there is almost no empirical knowledge and few clear ideas on what such nonacademic talents might be, why they are important, or how they are developed.

Empirically, it is nearly accuate to say that we know that academic talents alone (net of years of school completed) do not explain much about adult accomplishment, so this "residual" of unexplained variation must be due to some nonacademic skill or opportunity. Studies of outstanding adult accomplishment using personal wealth, managerial talent, scientific originality and architectural creativity have failed to show a relationship between grades or test scores and these accomplishments when years of school completed is taken into account.[49] All we know empirically about school effects on student outcomes is that short term educational variations explain little about academic achievement, which leads some to a search for more environmentally responsive skills or attitudes on which schools may have greater potential impact.

The lists of nonacademic skills that have been suggested recently include the following:

> -A.M. Mood: "Creativeness, confidence, integrity, ambition, being observant, humanity, self-discipline, social competence, sense of responsibility, ability to concentrate, enthusiasm, ability to reason, curiosity, conviction."[50]

-J. S. Coleman: "(1) intellectual skills, the kinds of things that schooling at its best teaches; (2) skills of some occupation that may be filled by a secondary school graduate, so that every 18-year old would be accredited in some occupation, whether he continued in school or not; (3) decision-making skills: that is, those skills of making decisions in complex situations where consequences follow from the decisions; (4) general physical and mechanical skills: skills allowing the young person to deal with physical and mechanical problems he will confront outside work, in the home or elsewhere; (5) bureaucratic and organizationak skills: how to cope with a bureaucratic organization, as an employee or a customer or a client, or a manager or an entreprenuer; (6) skills in the care of dependent persons: skill in caring for children, old persons, and sick persons; (7) emergency skills: how to act in an emergency, or an unfamiliar situation, in sufficient time to deal with the emergency; (8) verbal communication skills in argumentation and debate.[51]

-Holland and Richards: "scientific achievement, leadership achievement, speech and dramatic achievement, artistic achievement, writing achievement, musical achievement, social participation, social service achievement, business achievement, humanistic-cultural achievement, religious service, social science achievement, interpersonal competency.[52]

-Greenberger's Psycho-Social-Maturity: "individual adequacy (self-reliance, work-orientation, identity), interpersonal adequacy (communication skills, enlightened trust, knowledge of major roles), social adequacy (social commitment, openness to socio-political change, tolerance of individual and cultural differences)."[53]

Other interesting concepts on nonacademic student outcomes include moral development,[54] citizenship,[55] quality of school life,[56] and autonomy.[57] Of course there are also a great number of personality scales to measure variables such as self-esteem, locus of control and various coping skills.[58]

One way to organize these varied concepts and measures is to use the following four categories:

(1) Coping skills for specific situations. The emphasis in this category is on the specific environmental demands, where the measurement made for an individual is his or her attitudes of confidence in

meeting the demands and actual successful performance in a case where the demands are present. Coleman's list includes such concepts, and some subscales of well-known personality test batteries emphasize specific situational coping skills.[59]

(2) General personality dimensions that are important for a wide range of situations. Like IQ, there are well-researched measures of individual differences that are general characteristics of a mature personality that may be affected by schools. These include need for achievement, curiosity, self-esteem, locus of control, autonomy, realism, tolerance, value priorities, goal orientations and many more. Most of these measures do not refer to environmental demands as specific as those in the first category.

(3) Specific accomplishments and competencies. Frequently measured by a check-list of specific behaviors, this category includes musical talent, mechanical skills, clerical capabilities and work habits, interpersonal or leadership abilities, originality in specific sciences, and judgment in particular practical situations.

(4) Affective responses to specific environmental settings. The emphasis in this category is on affect: liking for and commitment to particular situations. The quality of school life, school satisfaction and job satisfaction measures are examples.

There seem to be two major tasks to accomplish in order to make headway towards including nonacademic outcomes in our study of school effects. First, we need evidence on what talents are needed and rewarded in specific adult occupational and social roles. What is required for

outstanding accomplishment as a successful businessman, politician, artist or scientist? Presently we know that IQ and grades are not very complete explanations for most adult accomplishments other than gaining entry to further education, and we know that some general personality characteristics such as high self-esteem and need for achievement are frequently correlates of performance in diverse fields. We also know that early life accomplishment in specific areas predicts later life success in the same areas. But we are far from understanding and measuring the specific nonacademic talents, attitudes and coping skills that are linked to specific noteworthy adult performances. An extended series of studies of individuals in adult roles that go beyond the general personality measure studies seems necessary if we are to discover what diversity of skills are needed for specific modern adult responsibilities. A condition that will often make the study of occupational accomplishment difficult is that features of the job market can be a determining factor for many success stories. "Being in the right place at the right time", or "connections" or the number of economic opportunities to earn a living in particular jobs, may have much to do with who does and who does not hold leadership positions in various adult occupations. Nevertheless, further studies of individuals recognized for specific accomplishments in life seem necessary if we are to have evidence for the diversity of human talents.

The second major task is to learn how various nonacademic talents are fostered and developed. What training, experiences and instruction will lead to the growth of particular coping skills and abilities?

Which skills can be quickly developed "on-the-job" because of the flexibility of the average person to understand and meet environmental demands, and which skills require extended training for specific sensitivity abilities or knowledge? What are the most effective and efficient training experiences for specific talents where extended time for learning is required? In other words, once we have a list of talents that provides good coverage of the skills required for important adult roles, we need a parallel list of the amount and kind of training experiences that will yeild performance in these skills.

III. School Organization and Student Motivation

This section outlines three directions for theory development which connect the organization, process and outcome variables defined previously. First, we present a discussion of tradeoffs of school effects on students. Second, we discuss trait-treatment interactions and individual differences. Third, we detail parallel mechanisms of social control and individual motivation that are linked to the main organizational variables defined earlier.

TRADEOFFS OF SCHOOL EFFECTS ON STUDENTS

It is possible that a particular school organization arrangement will be better than all other alternatives for certain positive effects on the average student, but that this same arrangement will have a weak or negative influence on other student outcomes compared to the other alternatives. In other words, what works best for some purposes may be counterproductive for others. Research should be directed to comparing alternative school structures on a variety of important student outcomes, because such comparative knowledge is what parents, school boards and educators need to make realistic plans and policies for how their schools should be run.

Such an understanding of the relative advantages and disadvantages of different school structures will focus the discussion of educational planners and policy makers on questions of goals and priorities by forcing them to consider the tradeoffs that are involved. If one school structure is shown to be more successful for test performance in basic skills or subject matter, but less successful than alternative

school arrangements for developing originality and self-reliance, one must first decide on the relative importance of these potential outcomes in order to conclude what kind of schools are to be established. Or, if one kind of school is judged by students to be distinctly preferable to others in the quality of school life experienced, then the importance of student satisfaction, commitment and relations with others must be considered in decisions about school organization. It follows that the student outcomes which will become most important in decisions involving tradeoffs or goal priorities will be those outcomes that show the most responsiveness to differences in school structure.[60]

Our present knowledge does not begin to approximate the matrix of tradeoffs of school effects on students that would be needed by parents and educational planners. At best, we now have indirect knowledge to suggest that some student outcomes may be less responsive than others to environmental rather than genetic influences[61], and that there can be a wide disparity between the level of development in different outcome domains.[62]

The following table of hypotheses provides an example of how our knowledge could be organized after comparative studies of school organization on a range of student outcomes have been completed and yielded clear results. Since this research has yet to be undertaken or accomplished, the values in the Table are completely hypothetical, chosen to highlight the potential complexity and usefulness of such knowledge.

Table III.1 shows the hypothetical relative advantage of each of four components of school organization on six broad classes of student outcomes. The final row of the table gives the largest absolute hypothetical difference due to any school component for the particular school outcomes. There are three important kinds of possibilities shown in this Table.

(1) A comparison of the values in the final row of the Table indicates that some student outcomes may be much more responsive to school changes than other outcomes. In this hypothetical example, cognitive learning is only slightly affected by school changes, while satisfaction with school is most open to influence, and various coping skills and elements of creativity are in-between. Such a finding, or some other clear ordering of outcomes by environmental sensitivity, would direct attention to outcomes that schools can most readily improve.

(2) The values in the body of the table show the possibility that each student outcome is most positively influenced by a different school component, and that changing particular school components can have positive effects on some outcomes at the expense of weak or negative influence on other outcomes. With such a matrix of outcomes, the public would have to place priorities or weights on the alternative student outcome goals in order to decide on the combination of school organization components it wished to establish to provide the educational environment for the average student.

Table III.1

MATRIX OF TRADEOFFS OF SCHOOL EFFECTS ON STUDENTS

(Values are hypothetical values of possible relative gains or losses in standardized scores of student outcomes due to school differences).

School Organization Property	Student Outcomes: Cognitive Learning (Basic Skills)	Originality or Creativity (Self-Reliance)	Perseverance and orderly Work Habits	Realistic Risk Taking and Problem Solving Ability	Tolerance for Differences	Satisfaction with School Life
Permissive vs. Controlled Authority Structure (High Involvement in Decisions)	-.02	+.08	-.03	+.02	+.03	+.15
High reward contingencies (regular response to student behavior with valued rewards).	+.02	-.03	+.09	-.05	-.01	-.15
Variety and novelty of Tasks (mixed modes of instruction, timing and social arrangements).	+.01	+.03	-.01	+.07	-.02	+.02
Mixed demographic Composition of students and staff.	-.01	.00	-.02	-.05	+.10	-.02
Range of Absolute Differences	.02	.080	.090	.070	.10	.15

TRAIT-TREATMENT INTERACTIONS AND INDIVIDUAL DIFFERENCES

A different kind of complication that has immediate policy implications for educational planners is the question of individual differences and trait-treatment interactions. It may be that schools cannot be organized for the "average" student, but that a variety of educational settings need to be provided to meet the differential sensitivities to school differences of students, depending on their background and earlier experiences. For example, one kind of student may need an open or permissive structure to capture his or her interest and meet individual motivational needs. On the other hand, another kind of student--perhaps coming from a less open family environment--may need the security of formalized authority and assignments to be able to function on important learning tasks.[63]

Knowledge of these school-student interaction effects would have important policy implications. It would mean that a variety of school environments would be needed to optimally meet the diverse needs of students, and that some mechanism would be needed to successfully make the match between individual student differences (which can change from grade to grade) and particular school environments.

To focus this discussion, Table III.2 presents some hypothetical differences for effects of open vs. traditional schools on the cognitive learning of students with differences on selected background variables. This table hypothesizes that older male students from more open and well-to-do families will learn at a more rapid rate in open schools, while traditional schools may have a stronger positive influence on their opposite numbers. (The only part of this table with any current evidence to support it is the differences due to age).

Table III.2

TRAIT-TREATMENT INTERACTIONS--STUDENT BACKGROUND AND SCHOOL AUTHORITY

(Hypothetical Differences for Cognitive Learning)

Student Attribute	Type of School Authority Structure	
	Open	Traditional
Age	Older	Younger
Openness of Family	Open Family	Traditional Family
Social Class	Upper	Lower
Sex	Males	Females

Thus, we may evolve a developmental prescription for school structure that depends upon the particular stage of readiness of individual students.

To add to the complication, it is possible that trade-offs and individual differences must be considered simultaneously. For example, while Table III.2 may show the interactions for cognitive learning, it may be that the opposite direction of sensitivity operates for developing self-reliance. That is, the students who may need a highly structured school for cognitive tasks may need an open school to get the practice in self-reliance they have not received elsewhere.

Our present knowledge of student-school interactions is almost nonexistent, and there is reason to believe that such higher-order effects will be found mostly for outcomes where schools have important direct effects. But, the importance and usefulness of seeking such knowledge has been frequently stated.[64]

MODES OF SOCIAL CONTROL AND INDIVIDUAL MOTIVATION

For a number of reasons, it is important to consider how future knowledge might be organized without the complexities of tradeoffs of priorities or major student-school interactions. This is reasonable because it is likely that one class of outcomes will remain primary (basic academic skills) and that school policy will be made for the average student alone (and local officials will be expected to react to individual differences on a case-by-case basis within a standard structure). Also, we are so far from a knowledge of complexities of tradeoffs or interactions, that research should begin with a simple organizing principle. For concreteness, let us assume that a school official seeks to maximize the academic growth of the average student, and wishes to consider the alternative methods that might be used to motivate student behavior toward this goal.

Three alternatives can be described. Each alternative can be classified in terms of (a) Type of compliance mechanism, (b) Type of individual student motivation, (c) Kind of incentive being used, and (d) School organization antecedents. The last element--school organization antecedents--is where research must be concentrated, because we have few findings to indicate how to organizationally activate each "compliance-motivational-incentive" alternative. To give some initial examples of possible research, we shall mention some organizational hypotheses for each of the three options. Table III.3 presents a diagrammatic outline of the parallel distinctions to be made.

First, there is coercive or utilitarian control which motivates student behavior through the <u>immediate rewards</u> or punishments offered

Table III.3

COMPLIANCE MECHANISMS, MOTIVATIONAL COMPONENTS AND SCHOOL ORGANIZATION

Organizational Compliance Mechanisms	Type of Individual Motivation	Kind of Incentive	School Organizational Antecedents
Coercive Power or Utilitarian Control	Immediate Rewards or Punishments	Immediate rewards that may be either official (controlled by the authority) or informal (from social or peer incentives)	Immediate Reward Contingencies Structure
	Intrinsic Motivation	Immediate rewards that inhere in the task (e.g. novelty, social, mode)	Task Components
Normative or Social Control	Internal Motivation	Long range rewards are expected to result from some immediate instrumental behavior that may be unrewarded at present	Recruitment; or student participation in choices involving alternatives with long range implications

to individuals for different behaviors. The main difficulty encountered in employing this type of control or motivation is to make the most valued rewards be contingent on appropriate behavior. The difficulty in schools is that the most valued rewards may be the informal approval or sanctions offered by student peers, which can motivate inappropriate behavior instead of actions related to successful learning. From this perspective, the most successful schools will either (a) use formal incentives that are more powerful than the existing informal ones, (b) eliminate or neutralize the counterproductive informal incentives or (c) capture the informal incentives so that they are naturally given to reward desired learning actions.

The school organization property directly related to this mode of compliance-motivation is the reward structure. Part II of this paper presented reward structure alternatives and discussed some motivational elements that may be connected to the alternatives.

Second, there is intrinsic motivation that derives from inherent features of the immediate task. Sociologists have not clearly labelled the control or compliance mechanisms that involve this kind of motivation or incentives. But psychologists have done considerable work to show that tasks can have inherent motivational power even though there may be no rewards from others that follow the action.[65] There are some who believe that this is merely a habit of conditioned response that carries over from an earlier history of being rewarded for similar behavior, while others hold that human beings find particular task features appealing, such as novelty or social contacts or levels of uncertainty and change.[66]

Part II of this paper discusses task structure from a motivational perspective and notes that schools are rarely analyzed in these terms.

Third, there is normative control that involves internal movitation of an individual. In this mode, as in the previous category of intrinsic motivation, appropriate behavior occurs without any need for immediate rewards from others in control or from peers. In other words, a school which can rely on the internal motivation of its students to learn the required material does not have to establish elaborate incentive systems to control students. In this ideal situation, school authorities need only make available appropriate instructional opportunities, minimize the bureaucratic apparatus that may distract students' time from learning, and simply get out of the way so students can follow their own drive to learn.

While the ideal situation--an entire student body that is internally motivated to learn--may be impossible for most schools to reach, research can be designed to discover how school organization may increase the proportion and strength of internal motivation among its students. There are two main approaches to consider: recruitment and socialization.

Two avenues to normative control

The usual method that organizations use to establish a membership which shares the main organizational goals is recruitment and selection of new members and weeding out of misfits. Obviously, some types of organizations are better equipped than others to use this mechanism. Churches try to recruit for their priests and ministers those individuals

who are personally committed to "saving souls." The marines emphasize a taste for combat and military adventure in advertising for their recruits. Scientific organizations and universities can appeal to potential staff with their opportunities for self-initiated research or interesting studies that respond to personal goals of scientists. But many industrial firms cannot offer noble goals or challenging work, and must recruit and hold a large proportion of their staff through immediate incentives of wages and benefits. And schools may be in the worst position of all since, as Stanton Wheeler has described[67], they have limited authority to select or dismiss their student members.

The contrast in the control and discipline problems faced by public secondary schools in comparison to private schools or post-secondary institutions reflects the obvious overriding disadvantage of student recruitment in public education. The schools with the least problems and least need for coercive or instrumental controls are those where the students self-select themselves because of a personal commitment to a demanding curriculum.[68]

Given the present distribution of student priorities, there may be some ways that the public school system could be reorganized to permit the mechanisms of self-selection to aid in the problems of social control. Some school systems are consciously providing a wider variety of educational options for students and parents, and these should be studied for their motivational consequences.[69] Does a greater student commitment to school result when a system provides alternatives for choice according to curriculum content (vocational programs versus academic ones) and to style

of operation (strict behavioral and program standards versus student self-direction)? How do differentiated systems deal with the problems of equity if some of the alternative schools develop an exclusiveness of advantages that are desired by a large number of potential members?[70]

Competency-based education that is being considered in several states[71] holds some promise for addressing the recruitment issues in education as they can affect student motivation. In some versions, competency based education releases many students from the obligation to attend school if they can demonstrate mastery according to established academic standards for graduation. Although these provisions may offer relief only for those involuntary students who are the highest academic performers, this may eliminate some of the control problems faced by schools. The more general version of competency-based education, which has not been attempted on any wide-scale basis, would also have to release the poorer students (who are most likely to have low motivation and create the majority of discipline problems in schools). The ideas expressed by the President's Panel on Youth[72] of using work place apprenticeships as an official part of schooling and giving graduation credit for non-academic accomplishments may be the necessary elements for treating the school recruitment problem for the poorer students. But political and economic roadblocks to such revisions in the general structure of public education are formidable and require detailed and serious analyses.

But given that a majority of a school's student body is assigned without choice to the school and program, what kinds of research would help our understanding of ways to develop rather than recruit a larger number of committed students? It is helpful to reformulate the factor of internal

motivation in terms of rewards in order to think about research on student internal commitment.

The behavioral definition of an internally motivated individual is that the person's behavior does not readily respond to immediate reward contingencies. Such an individual will not as easily succumb to peer pressures to change behavior and is relatively immune to variations in official reward conditions. A person who is capable of ignoring immediate rewards must have some compensating rewards to motivate his or her actions. In simplest terms, these compensating inducements can be described as future or long range rewards for which immediate behavior has some instrumental meaning. If we look at it in this way, the research questions for schools then become (a) how do individuals develop strong long range goals for which desired behavior in schools is appropriate, and (b) how can schools make the connection between behavioral demands and instrumental rewards for appropriate future intentions?

Behavioral sociologists theorize that personal commitments to standards or future goals are conditioned responses that develop from an extended history of social inducements from parents and other significant persons.[73] According to this view, an individual without a strong future goal orientation or without strong moral norms is a product of weak socialization --responses from important social settings were relatively absent concerning these issues. In these cases, the good habits of conforming to particular standards were not effectively conditioned, or the value and importance of reaching particular goals was not learned through regular reinforcement.

It is easier to think of organizational features of schools which can help to make the instrumental connection between established personal goals and present behavior, than to generate hypotheses about how school environments may serve to develop strong goal commitments in place of weak ones. However, in each case, the idea of student choice of instructional alternatives may be a fruitful subject for research.

What choice creates is the need for information about the long run and short-run consequences of the available options. To decide between two alternatives, a person will seek out or be receptive to knowledge of how each of the choices can serve or penalize him in various ways. Without a choice of behavioral alternatives, information about long-run benefits of current assignments is not of much interest because they cannot be used to change assignments or action.

Melvin Seeman's research on alienation and information seeking or learning is relevant here.[74] His studies show that individuals pay most attention to environmental cues and learn new facts for matters where they feel they have some control or choice. In the same way, if schools wish students to pay attention to information about how their present instruction may be important for future occupational and life goals, then they should consider providing alternatives for student choice that have different relevance for various goals. If academic choices are offered that can have different explicit long run consequences for students, we would expect students to seek and be receptive to knowledge about long range goals and how schooling can play an instrumental role in achieving these goals. In other words, carefully designed academic choices can help to increase internal motivation (a) by fostering the

development of the long range goals needed to offset the attraction of immediate peer and school rewards, and (b) by enhancing the understanding of the instrumental value of school programs to increase the ability to defer immediate gratifications.

Now it is clear that a number of detailed questions must be studied and answered to implement and administer student choice in schools in order to have these results.[75] How can choices be administered so that considerations of the immediate consequences for report card grades and classroom standards are not the dominant element in student decisions? (Evidence on use of Pass-Fail grade options in college, and evidence from decision-making studies on strategies to "balance" investments would be helpful here. For example, it appears that the number of simultaneous choices to be made at a given time is important for permitting a decision-making strategy where demanding selections can be balanced with less demanding ones.) How are problems of classroom composition and teacher assignments handled in administering a program of student choice of learning alternatives? And most fundamentally, what variables are to be used to define the alternatives which are provided for student choice For example, in defining alternatives, should standards for performance be made explicit at the outset, should traditional subject matter distinctions be used, should general classes of experiences or talents be used as organizing principals for choices, should requirements be included as well as options? Also, do students need special training in decision-making skills to handle opportunities for choice;[76] and is there a "settling in period" for students which schools must tolerate if choices are to be made

responsibly? Finally, given increased receptiveness of students to occupational information, how should the counseling and occupational experience apparatus of schools be organized and administered to provide the knowledge to students?

To address the issue of how school organization can affect the direction and degree of students' internal motivation requires basic research on the psychology and sociology of personal commitment, as well as empirical evaluations of school practices which are clear derivations of hypotheses about causal relationships. At this time, there is very little basic research or empirical evaluations being conducted.

Summary on student motivation in schools

The classification offered here of three broad classes of student motivation or school control mechanisms does not suggest that one will prove most effective for all schools. It does show that schools, by the way they organize their rewards, tasks and authority, have the potential to motivate students in different (through perhaps simultaneous) ways. Most of the current thinking by social scientists has concentrated on the organization of immediate incentives to motivate students. While this approach may be most effective for a general population of students, it can be costly and administratively burdensome to implement directly. But student motivations that we have called intrinsic or internal are also possibilities. Educators need to know about a broader range of motivational resources at their disposal and how to facilitate their use. We need research which specifies the motivational alternatives through school organization changes, and which assesses their efficiency and effectiveness for various classes of students and for a variety of student outcomes.

IV. Deriving a Research Plan

This paper's conceptualization of school effects on student outcomes suggests three broad kinds of research activities to make progress toward improving school productivity.

First, we need methodological studies to address some major technical issues in estimating school effects. These involve statistical or analytical questions as well as measurement ones. For example, we need approaches to estimate the cumulative effects of school differences over extended time durations, and efficient strategies to search for student-school interaction effects. The first section of this paper lists several other critical analytic issues for realistic estimation of school effects. But we also need to greatly broaden the range of student outcomes we can measure for possible effects. The second section of this paper gives some reasons why expanding the dependent variables in school effects research is called for, and lists some of the possibilities and research strategy considerations.

Second, we need focused studies of specific causal connections between particular school organization properties, social processes and student outcomes. This means empirical evaluations of those natural experiments which can be found in specific schools which vary task, authority or reward systems. We need to know more about how the typical school operates in terms of grades, assignments and interpersonal processes to increase our understanding of how the current situation impacts various categories of students. And, we need to capitalize on important school variations where they can be found to learn about the realistic potential of school modifications. Since the history of proposed innovations in school organization is usually one of failure to change,

investments in field studies should be carefully timed to coincide with the actual implementation of innovations, so the research resources are not wasted on documenting only the next failures to innovate new ideas. We need actual studies to assess real school differences, even though the level of theoretical generality may appear mundane or indirect. The goal is to establish clear direct evidence on school effects for learning, with the theoretical base to be enhanced by the findings. Specific improvements in school practice are as likely to come from such direct studies as from other work that is less empirical or that is conducted in artificial settings.

Third, we need basic research on processes of human motivation and the environmental circumstances that can activate different possibilities. Because of the nature of basic research, it is difficult to set specific priorities on the relationships to be investigated. However, if a case can be made that certain studies may serve to change general perspectives on the learning process, these studies should command some allocation of research support. In this paper, we have given the topics of intrinsic and internal motivation and their environmental antecedents as examples of potentially important topics with infrequent prior attention.

Footnotes

1. Hallinan and Sorensen (1975).

2. See Blum (1972), Coleman, Berry and Blum (1972), Coleman, Blum, Sorenson and Rossi (1972) and McPartland and York (1967) for examples of the use of duration measures in social research. The use of longitudinal data raises the familiar questions of the regression effect and change scores (See Richards 1974 for evidence that simple measures may be sufficient in most cases) and how to incorporate lag-variables in over-time models.

3. Klitgaard and Hall (1973) and Klitgaard (1974).

4. See Mood's interpretation in Mayeske et. al. (1972).

5. Karweit (1975, 1976).

6. Wiley and Harnishfeger (1976).

7. See for example McPartland and Sprehe (1973) for a use of empirically based assumptions in projecting the potential impact of school differences.

8. For example, analogous measures of family and school authority structures can be established, so that knowledge gain from existing family differences can have implications for potential school authority changes. See, for example, McPartland and Epstein (1976).

9. See Berliner and Cahen (1973).

10. Recent papers on ridge regression demonstrate one approach to inverting covariance matrices that include highly correlated interaction and main effect variables. Hoerl and Kennaid (1970).

11. See for example Carver (1975) on achievement tests, and the studies of Greenberger and associated (1974, 1976) which used developmental criteria for scale construction.

12. See for example Bowles and Levin (1968) on the treatment of student background variables in school effects research.

13. Duncan (1970).

14. See Finney (1972) for the problem of confounded variation in the estimation of indirect paths.

15. Wiley (1973) discusses some of the statistical adjustments which may be called for in treating multiple levels of analysis in school productivity research. McDill and Rigsby (1973) discuss the proximate-distant considerations in analysis of school contexts.

16. Hauser (1970).

17. McPartland and Epstein (1976).

18. For similar general formulations, see for example Brookover and Erikson (1975), Boocock (1972), Herriott and Hodgkins (1973), Mayeske et al. (1972, 1973a, 1973b, 1975), Astin (1970), Averich et al. (1972), Corwin (1974), and Spady (1973).

19. See for example Hoyt (1965), Baird (1976), Jencks (1972), and Berg (1971).

20. Michaels (1974) and Slavin (1975).

21. Michaels (1974), Slavin (1975) and references contained in these reports to Michaels research on distributive justice.

22. Research on the use of cooperative vs. competitive reward structures in classrooms has been so mixed that four reviewers of this research over the last fifteen years have reached four different conclusions--that cooperation is better for most school tasks (Johnson and Johnson, 1974), that competition is better (Michaels, 1975), that cooperation is best for "problem solving" and competition best for other tasks (Miller and Hamblin, 1963), and that cooperation is best under certain circumstances and when group members must share resources to do their work (Slavin, 1975). However, the research evidence in which cooperative and competitive reward structures are compared in actual classrooms in which cognitive skills are taught over a period of at least several weeks is very limited.

    The review of research offered by Slavin (1975) concluded with the following major points:

    a. Contrary to current beliefs, the laboratory or laboratory-like research on interpersonal reward structure supports a conclusion that, unless subjects have important resources to share or withhold at their discretion, competitive and individual reward structures are more effective than cooperative ones for increasing performance.

    b. Classroom research comparing the effects of different reward structures on performance has been scant, but there is reason to believe that further research with certain kinds of small group cooperative structures may yet produce achievement gains for such structures.

    c. Consistently positive effects of cooperative reward structures on social connectedness dimensions point to an important reason for continuing the search for effective cooperative reward structures--that it may be possible to permanently change the climate of the classroom in a way that promotes mutual attraction and acceptance among students.

23. This Center has completed 24 research studies on TGT and is currently marketing TGT materials in basic skills on a national basis through a contractual agreement with Argus Corporation.

24. Previously, the other center of research activity in group contingencies was at CEMREL through the work of Hamblin, Wodarski and associates.

25. Recent Center research on open classrooms shows how structurel properties affect what teachers will informally reward. See McPartland and Epstein (1976).

26. Spady (1974).

27. See for example Blan and Scott (pp. 27-32).

28. Spady (1974), Becker (1953), Bordon (1955).

29. This formulation is given in greater detail in McPartland and McDill (1975, 1974, 1971).

30. See March and Simon.

31. See Etzioni (1961, 1964) (pp. 59-61).

32. See Boocock text (p. 163), which treats Banelas and Leavit studies.

33. Barker and Gump (1964), Barker et al. (1970).

34. Boocock (1972) (pp. 155-158).

35. McPartland and McDill (1975).

36. See Sørensen (1970) for a discussion of tracking and the differentiation process in schools.

37. McPartland (1968).

38. Sørensen (1970).

39. Karweit (1976); Hallinan (1974).

40. Feldman and Newcomb (1969).

41. Astin (1970), Astin and Panos (1969).

42. Karweit (1976).

43. McPartland and Epstein (1976).

44. Elashoff and Snow (1971).

45. Gage (1976).

46. Enstwisle and Webster (1972, 1974).

47. McPartland and Epstein (1976).

48. Cohen et. al. (1966).

49. Some important references on this matter include Wolfe (1969), Hoyt (1965), Jencks (1972), Berg (1971), Dreeben (1967), and Baird (1976). For a contrasting view see Lindgren (1971).

50. Stated in Forward to Marjeske et al. (1975).

51. Coleman (1972)

52. Holland (1966), Holland and Richards (1967), Richards, Holland and Lutz, (1967). See Munday and Davis (1974) for some of the measures used in this research. A scale of interpersonal competency is presented in Holland Baird (1968).

53. See Greenberger (1976) and Greenberger and Sorenson (1974).

54. See for example Bidwell (1972) and Sugarman (1975).

55. See for example National Assessment of Educational Progress (1970, 1971).

56. See for example Epstein and McPartland (1975) and Jackson (1968), pp. 39-112.

57. See Elder (1968), Kohn (1969) and Epstein and McPartland (1975).

58. Useful compendia of personality and attitudinal measures include: Backer (1972), Bonjean, Hill and McLemore (1967), Binos (1972), Chun, Cobb and French (1975), Comrey, Backer and Glaser (1973), Johnson and Bourmarito (1971), Lake, Miles and Earle (1973), McReynolds (1968, 1971, 1975), Miller (1970), Robinson, Athenasion and Head (1969), Robinson, Rusk and Head (1968), Robinson and Ahaver (1973), Shaw and Wright (1967).

59. For example, The California Personality Inventory includes subscales of coping skills for situations demanding conformity and for situations demanding originality. Gough.

60. Jencks has declared this may be the outcome that will most distinguish one approach to schooling from others and therefore will come to be most important.

61. The recent attention to the "nature-nuture" controversy regarding cognitive skills and I.Q. which has centered on the work of Arthur Jensen, has indicated that genetic factors are very important for this class of outcomes. This suggests that non-academic skills and attitudes may be much more environmentally responsive for the average student than skills measured by tests of cognitive learning.

62. The most well known studies in this area have proceeded from the work of Getzels and Jackson on the possibility of low correlation between individual intelligence and creativity or originality. See also Holland and Richards, and Wolfe.

63. This speculation is opposite to the current findings on open schools, where no consistent specific background-school interactions have been found. See Center Reports 192, 193, and 194.

64. Berliner and others.

65. Wheeler (195).

66. Kingman Brewster, the President of Yale, introduced the concept of the "involuntary student" in colleges to help explain student disturbances in the late sixties.

67. Some of the cases in the NIE experimental schools program have offered a variety of school settings within a system.

68. The "cooling out process" has been analyzed by Clark (1960) for the differentiated system of higher education in California.

69. See for example, Spady (1974).

70. Panel on Youth of the President's Science Advisory Committee (1973).

71. An extensive development of this viewpoint can be found in Scott (1971).

72. See Seeman (196 , 1962, 1967) and also Coleman's (1964) comment on this research.

73. Some preliminary treatment of the factors which may condition effects of academic choice can be found in McPartland, McDill et al. (1971) pp. 157-178.

74. The "values clarification" school of thought maintains that certain intense encounter groups are needed to focus attention on long term goals. The evidence to support this claim and the political or public opinion factors affecting the use of analogous methods in public schools should be carefully assessed. The approach being taken in this paper is to learn about the school conditions which will make students more interested in and receptive to issues of long term goals before concentrating on how to serve the increased interest that may emerge.

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